claims readable on the elected species. Applicants further elect the species of claim 33 with respect to the election for claim 32. Claim 32 and claims 40-46 and 48-55 are generic read on the elected species; claim 33 reads on the elected species. Finally, applicants elect adenovirus and the species for claim 52; claims 32-55 are generic and read on the elected species.

Should the examiner have any questions regarding this response, a telephone call the undersigned invited.

Respectfully submitted,

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## APPENDIX A: MARKED UP COPY OF AMENDED CLAIMS

5. (Amended) A DNA segment comprising a protein coding region encoding an Osterix polypeptide, wherein said polypeptide comprises a transactivation domain, a zinc finger domain and a proline rich domain.

6. (Canceled) The DNA segment of claim 1, wherein said sequence comprises a transactivation domain.

7. (Amended) The DNA segment of claim [2]1, wherein said transactivation domain comprises an amino acid sequence from between position 27 and position 270 of SEQ ID NO:2.

8. (Canceled) The DNA segment of claim 1, comprising at least one zinc finger domain.

9. (Amended) The DNA segment of claim [5]1, wherein said zinc finger domain comprises an amino acid sequence from between position 290 and position 374 of SEQ ID NO:2.

10. (Canceled) The DNA segment of claim 1, comprising a proline rich domain.

11. (Amended) The DNA segment of claim [8]1, wherein said proline rich domain comprises an amino acid sequence from between position 27 and position 192 of SEQ ID NO:2.

12. (Canceled) A recombinant Osterix polypeptide prepared by expressing an Osterix polypeptide in a recombinant host cell and obtaining the expressed Osterix polypeptide.

13. (Canceled) A method of treating osteoporosis in a patient, comprising administering to a site a therapeutically effective amount of an expression vector, wherein said expression vector comprises a polynucleotide encoding an Osterix polypeptide under the transcriptional control of a promoter, and wherein expression of said Osterix polypeptide results in treatment of said osteoporosis.

14. (Canceled) The method of claim 56, wherein the promoter is a constitutive promoter.

15. (Canceled) The method of claim 56, wherein the promoter is an inducible promoter.

16. (Canceled) The method of claim 56, wherein the promoter is a noninducible promoter.

17. (Canceled) The method of claim 56, wherein the expression vector comprises a viral vector.

18. (Canceled) The method of claim 60, wherein the viral vector is selected from the group consisting of vaccinia virus, adenovirus, herpesvirus, retrovirus, cytomegalovirus, and adeno-associated virus.

19. (Canceled) The method of claim 56, wherein said expression vector is delivered endoscopically, intraveneously, intraarterially, intramuscularly, intralesionally, percutaneously, or subcutaneously.

20. (Canceled) The method of claim 56, wherein said administration is repeated.

21. (Canceled) A composition comprising a purified Osterix polypeptide.

22. (Canceled) The composition of claim 64, wherein said polypeptide comprises an isolated Osterix zinc finger domain.

23. (Canceled) The composition of claim 64, wherein said polypeptide comprises an isolated Osterix transactivational domain.

24. (Canceled) The composition of claim 64, wherein said polypeptide comprises an isolated Osterix proline rich domain.

25. (Canceled) A purified polypeptide of between about 5 to about 20 amino acids in length comprising a sequence from SEQ ID NO:2.

26. (Canceled) An antibody that is immunologically reactive with Osterix.

27. (Canceled) A method for identifying an effector of Osterix transcription, said method comprising admixing, (i) a vector expressing Osterix as well as a reporter gene that measures Osterix expression, and (ii) a candidate substance, and identifying the candidate substance that alters the transcription of the reporter gene by said Osterix.

28. (Canceled) The method of claim 70, wherein said vector expressing Osterix comprises engineered cells that express recombinant Osterix.

29. (Canceled) The method of claim 70, wherein said reporter gene is selected from luciferase, or green fluorescent protein.

30. (Canceled) The method of claim 70, wherein said effector stimulates cell differentiation of a precursor cell into an osteoblasts by Osterix.

31. (Canceled) The method of claim 70, wherein said effector modulates cell differentiation of a precursor cell into an osteoblast by Osterix.

32. (Canceled) A method for identifying a stimulatory agent, comprising the steps of:

a) admixing a composition comprising a population of precursor cells capable of expressing Osterix;

b) incubating the admixture with a candidate substance;

c) testing said admixture for precursor cell differentiation; and

d) identifying the candidate substance that stimulates the differentiation of precursor cells into osteoblasts.

33. (Canceled) The method of claim 76, wherein the precursor cells are mesenchymal precursor cells.

34. (Canceled) A method for identifying an inhibitory agent, or a stimulatory agent, comprising the steps of:

a) admixing a first composition comprising a population of recombinant cells expressing Osterix with a second composition comprising a population

b) incubating the admixture with a candidate substance;

c) testing said admixture for osteoblast activation; and

d) identifying a candidate substance that inhibits, or stimulates, the activation of osteoblasts.

## APPENDIX B: CLEAN COPY OF PENDING CLAIMS

1
35. A DNA segment comprising a protein coding region encoding an Osterix polypeptide, wherein said polypeptide comprises a transactivation domain, a zinc finger domain and a proline rich domain.

3
36. The DNA segment of claim 1, wherein said transactivation domain comprises an amino acid sequence from between position 27 and position 270 of SEQ ID NO:2.

4
37. The DNA segment of claim 3, wherein said Osterix polypeptide is further defined as having the sequence of SEQ ID NO:5.

6
38. The DNA segment of claim 1, wherein said zinc finger domain comprises an amino acid sequence from between position 290 and position 374 of SEQ ID NO:2.

7
39. The DNA segment of claim 6, wherein said Osterix polypeptide is further defined as having the sequence of SEQ ID NO:4.

9 8
40. The DNA segment of claim 1, wherein said proline rich domain comprises an amino acid sequence from between position 27 and position 192 of SEQ ID NO:2.

10
41. The DNA segment of claim 9, wherein said Osterix polypeptide is further defined as having the sequence of SEQ ID NO:6.

11
42. The DNA segment of claim 1, wherein said Osterix polypeptide is further defined as having the sequence of SEQ ID NO:2.

12
43. The DNA segment of claim 5, wherein said zinc finger domain is 77.6% homologous with transcription factor Sp-1

13

44. The DNA segment of claim 5, wherein said zinc finger domain is 69.4% homologous with transcription factor Sp-2.

14

45. The DNA segment of claim 5, wherein said zinc finger domain is 77.8% homologous with transcription factor Sp-3.

15

46. The DNA segment of claim 5, wherein said zinc finger domain is 77.8% homologous with transcription factor Sp-4.

16

47. The DNA segment of claim 1, encoding an Osterix polypeptide comprising a contiguous amino acid sequence from SEQ ID NO:2

17

48. The DNA segment of claim 1, wherein said DNA segment comprises a contiguous nucleic acid sequence from SEQ ID NO:1.

18

49. The DNA segment of claim 1, encoding an Osterix protein of 428 amino acids in length.

19

50. The DNA segment of claim 1, wherein the Osterix coding region is positioned under the control of a promoter.

20

51. The DNA segment of claim 19, wherein said promoter is a recombinant promoter.

21

52. The DNA segment of claim 19, further defined as a recombinant vector.

22

53. A recombinant host cell comprising a DNA segment of claim 1.

23

54. The recombinant host cell of claim 22, further defined as a prokaryotic host cell.

24

55. The recombinant host cell of claim 23, wherein the prokaryotic host cell is a bacterial host cell.

25
56. The recombinant host cell of claim 24, wherein the bacterial host cell is *E. coli*.

26
57. The recombinant host cell of claim 22, further defined as a eukaryotic host cell.

27
58. The recombinant host cell of claim 26, further defined as an osteoblast.

28
59. The recombinant host cell of claim 27, wherein said osteoblast is a BMP2-treated C2C12 cell.

29
60. The recombinant host cell of claim 26, further defined as a mesenchymal precursor cell.

30
61. The recombinant host cell of claim 22, wherein the DNA segment is introduced into the cell by a recombinant vector comprising a DNA segment encoding an Osterix polypeptide positioned under the control of a promoter.

32
62. A nucleic acid segment characterized as:

a) a nucleic acid segment comprising a sequence region that consists of 14 nucleotides that have the same sequence as, or are complementary to, at least 14 contiguous nucleotides of SEQ ID NO:1; or

b) a nucleic acid segment of from 14 to 10,000 nucleotides in length that hybridizes to the nucleic acid segment of SEQ ID NO:1, or the complement thereof, under standard hybridization conditions.

33
63. The nucleic acid segment of claim 32, wherein the segment comprises a sequence region of at least 14 contiguous nucleotides from SEQ ID NO:1 or the complement thereof.

34
64. The nucleic acid segment of claim 33, wherein the segment comprises a sequence region of at least 17 contiguous nucleotides from SEQ ID NO:1 or the complement thereof.

35
65. The nucleic acid segment of claim 34, wherein the segment comprises a sequence region of at least 20 contiguous nucleotides from SEQ ID NO:1 or the complement thereof.

36
66. The nucleic acid segment of claim 35, wherein the segment comprises a sequence region of at least 25 contiguous nucleotides from SEQ ID NO:1 or the complement thereof.

37
67. The nucleic acid segment of claim 36, wherein the segment comprises a sequence region of at least 30 contiguous nucleotides from SEQ ID NO:1 or the complement thereof.

38
68. The nucleic acid segment of claim 37, wherein the segment comprises a sequence region of at least 35 contiguous nucleotides from SEQ ID NO:1 or the complement thereof.

39
69. The nucleic acid segment of claim 38, wherein the segment comprises a sequence region of at least 40 contiguous nucleotides from SEQ ID NO:1 or the complement thereof.

40
70. The nucleic acid segment of claim 32, wherein the segment hybridizes to the nucleic acid segment of SEQ ID NO:1 or the complement thereof under stringent hybridization conditions.

41
71. The nucleic acid segment of claim 40, wherein the segment is at least 17 nucleotides in length.

42
72. The nucleic acid segment of claim 41, wherein the segment is at least 20 nucleotides in length.

43
73. The nucleic acid segment of claim 42, wherein the segment is at least 25 nucleotides in length.

44
74. The nucleic acid segment of claim 43, wherein the segment is at least 30 nucleotides in length.

45
75. The nucleic acid segment of claim 44, wherein the segment is at least 35 nucleotides in length.

46
76. The nucleic acid segment of claim 45, wherein the segment is at least 40 nucleotides in length.

47
77. The nucleic acid segment of claim 32, wherein the segment is up to about 3 kilobasepairs in length.

48
78. An expression cassette comprising a polynucleotide encoding a polypeptide having the sequence of SEQ ID NO:2, wherein said polynucleotide is under the control of a promoter operable in eukaryotic cells.

49
79. The expression cassette of claim 48, wherein said promoter is heterologous to the coding sequence.

50
80. The expression cassette of claim 48, wherein said promoter is a tissue specific promoter.

51
81. The expression cassette of claim 48, wherein said promoter is an inducible promoter.

52
82. The expression cassette of claim 48, wherein said expression cassette is contained in a viral vector.

53
83. The expression cassette of claim 52, wherein said viral vector is selected from the group consisting of a retroviral vector, an adenoviral vector, and adeno-associated viral vector, a vaccinia viral vector, and a herpesviral vector.

54
84. The expression cassette of claim 48, wherein said expression cassette further comprises a polyadenylation signal.

55
85. A cell comprising an expression cassette comprising a polynucleotide encoding a polypeptide having the sequence of SEQ ID NO:2, wherein said polynucleotide is under the control of a promoter operable in eukaryotic cells, said promoter being heterologous to said polynucleotide.